Quick Start Guide

Cyl-Tel® & Tank-Tel®

Liquid Level Gauges

TANK-TEL®

Designed and Built by:

Chart Inc.

407 7th Street NW
New Prague, MN 56071 USA
(800) 400-4683

Part Number 20664277 Rev. D
© 2015 Chart Inc.

Contents

Revision Log iv

Preface 1
General 1
Highlights 1
Quick Start Guide 1
Terms 2
Acronyms / Abbreviations 2

Instructions 3
Installation 3
Initial Setup 3
ON Button 3
Keypad Use 3
Cyl-Tel/Tank-Tel Quick Start Guide 4
First Time Setup (‘NO TANK SET’ displayed) 4
DP Sensor (selecting correct sensor type) 4
DP Zero (Tare the DP Sensor) 4
Setting Correct Saturation Pressure 5
Standard Tank Configuration (If Gauge Previously Setup) 5
Setting Alarms 5
Troubleshooting 6
Standard MicroBulk Tank List 8
Cyl-Tel/Tank-Tel Sensor Names 9
Differential Pressure Sensors 9
Gauge Pressure Sensors 9

Revision Log

Revision Level	Date	Description
B	07/15/2014	Reformat with new layout and update to include Gen 4.
C	10/06/2014	Add Sensor Names section
D	04/10/2015	Update information in #5 of DP Sensor (Selecting correct sensor type) section

Preface

General

The Cyl-Tel & Tank-Tel Liquid Level Gauges are digital electronic level gauges. The gauge has been updated to Gen 4 to include the latest in electronic and differential pressure measurement technologies. The new design includes accurate liquid level reading using differential pressure, a graphical display, and a simplified logic with nine selectable units of measure that eliminate the need for lookup charts. The Cyl-Tel & Tank-Tel gauges are telemetry-ready with built-in outputs which eliminate the need for additional boards and is completely compatible to most current telemetry system requirements.

Highlights

- Improves customer readability by eliminating calibration charts
- Programmable to tank model or by tank geometry
- Telemetry-ready outputs compatible with many systems
- Standard pulse and voltage outputs (and optional 4-20mA with interface board); as well as 3 alarm (digital) outputs
- Power: Battery (2 x 1.5V Long Life Lithium) powered or optional 12Vdc adapter (for continuous power)
- Improved readability with a graphical display
- Built-in additional analog input port (0-5V) for optional pressure sensor connection

Quick Start Guide

This Cyl-Tel & Tank-Tel Quick Start Guide is designed to be used in conjunction with PN 20544482 Cyl-Tel & Tank-Tel Product Manual. If there are any questions regarding the operation of the Cyl-Tel/Tank-Tel gauge, contact Chart's Technical Service at 1-800-400-4683.

To obtain a complete installation and user manual, please scan QR code or go to: www.chartparts.com and click on Manuals, then MicroBulk, then PN 20544482 Cyl-Tel & Tank-Tel Product Manual.

Terms

Throughout this quick start guide safety precautions will be designated as follows:

Caution! Description of a condition that can result in equipment or component damage.

Note: *A statement that contains information that is important enough to emphasize or repeat.*

Acronyms / Abbreviations

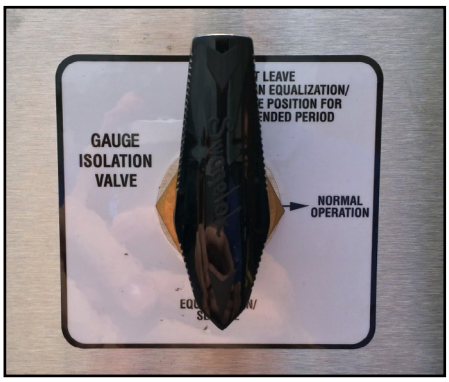
The following acronyms / abbreviations are used throughout this manual:

Ar	Argon
CO_2	Carbon Dioxide
N_2	Nitrogen
O_2	Oxygen
PB	Pressure Builder
PSID	Pounds per Square Inch Differential

Instructions

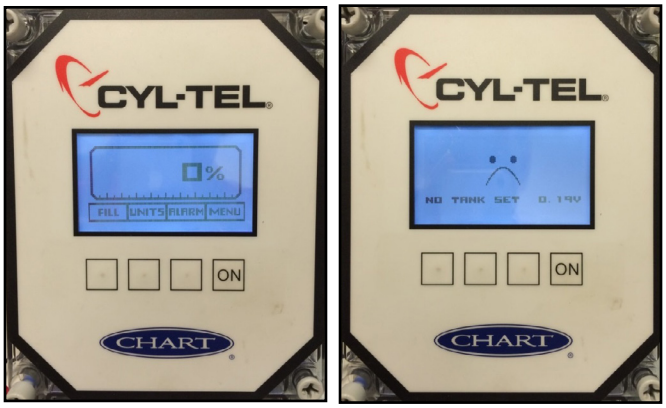
Installation

The Cyl-Tel/Tank-Tel Liquid Level Gauge has a maximum operating differential pressure of 29 psid. In order to protect the sensor from damage, ensure that the equalization valve is in the 'EQUALIZATION SERVICE' position before removing or installing a Cyl-Tel/Tank-Tel Gauge onto a Chart tank. If the valve is not in equalization then the diaphragm in the sensor can be permanently damaged. Refer to the user manual for more information.



Initial Setup

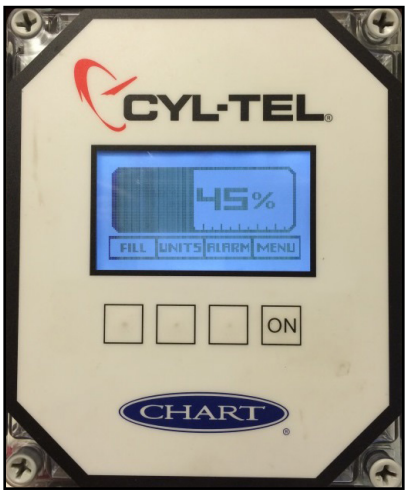
Upon receiving, the Cyl-Tel/Tank-Tel Gauge will look one of two ways. If it has been setup at the factory it will show 0% (left). If it has not been setup it will show a sad face (right).



If "NO TANK SET" is displayed, refer to First Time Setup in this guide.

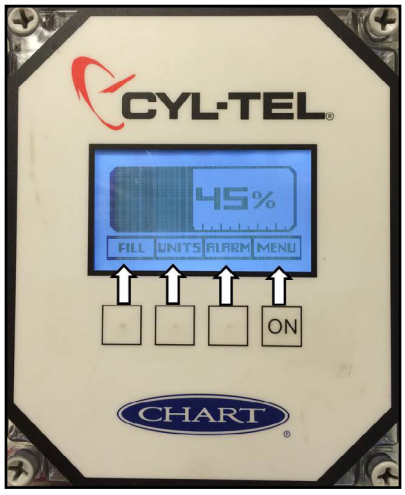
ON Button

Pressing the 'ON' button will turn the Cyl-Tel/Tank-Tel Gauge display on and run through the startup diagnostics and tests. When the test is complete the screen will display the tank's liquid level and pressure (pressure display is optional). Once the unit is on and the level is displayed, holding the 'ON' button for 15 seconds will access the Cyl-Tel/Tank-Tel Gauge setup menus.



Keypad Use

There are four buttons on the Cyl-Tel/Tank-Tel Gauge face. Each one has a different purpose. Each button performs the operation of the text box above the button on the screen.



FILL - This button will lock the display on for 15 minutes.

UNITS - This button will toggle the different units available.

ALARMS - This button will toggle the display of any setup alarms on and off. It will not clear any alarms.

MENU - When on, holding this button for 15 seconds will allow the user to enter the 'MAIN MENU' for the gauge.

Cyl-Tel/Tank-Tel Quick Start Guide

First Time Setup ('NO TANK SET' displayed)

1. With the 'NO TANK SET' screen displayed, press and hold the 'ON' button for 15 seconds (*'PLEASE WAIT'* will display) or until the 'SETUP STD TANK' screen is displayed.
2. On the 'SETUP STD TANK' menu use the up and down buttons to toggle through the different tank types. Select the desired tank type by pressing the 'NEXT' button.
3. The next screen is the 'SET CONTENTS' menu. Use the up and down buttons to cycle through the different contents (N_2, O_2, Ar, and CO_2). Select the desired contents by pressing the 'NEXT' button.
4. On the 'SETUP DISPLAY' screen, select the desired default units-of-measure by pressing the 'NEXT' button. Then use the up and down buttons to scroll through the various units. This selection will be the default units which are displayed every time the 'ON' button is pressed. Once the desired units are selected, press the 'NEXT' button.

Note: *Level reading can always be displayed in other units-of-measure on the main screen by pressing the 'UNITS' button.*

5. To save the settings scroll down to the 'SAVE' option and press the 'NEXT' button.
6. Confirm that the correct DP Sensor is selected by following the steps in the DP Sensor section in this guide. Remember to DP Zero the gauge after it is installed by following the steps in the DP Zero section in this manual.
7. Press the 'EXIT' button to return to the main screen.

DP Sensor (selecting correct sensor type)

Note: *The gauge can come with a variety of different sensors depending on the range needed for the tank. To ensure an accurate reading the correct sensor must be chosen.*

Note: *Changing the sensor type also resets the DP Zero setting. Upon changing the DP Sensor type remember to follow the DP Zero procedure.*

1. Press the 'ON' button to turn on the gauge display.
2. Hold the 'ON' button for 15 seconds to access the MAIN MENU.
3. Scroll down and select the 'MORE' option by pressing the 'NEXT' button.
4. Scroll down and select the 'DP Sensor' option by pressing the 'NEXT' button.
5. Use the up or down arrow buttons to toggle between sensor types. If there is a brass block on the back of your gauge the sensor type should be DP4. If there is a stainless steel sensor on the back of your gauge the sensor type should be DP1. The sensor type is on the label on the top or back of the Cyl-Tel/Tank-Tel gauge. Refer to the sensor names table in this guide for more information.
6. When the desired sensor type is selected press the 'NEXT' button to apply the setting.
7. After selecting the correct sensor type remember to set the DP Zero setting in the following section.
8. To save these settings scroll down and select the 'SAVE' option by pressing the 'NEXT' button.
9. Exit the menu by pressing the 'EXIT' button.

DP Zero (Tare the DP Sensor)

Caution! Proper calibration (DP Zero) is critical for accurate liquid level measurement. The DP Zero function is similar to the "Tare" function on a digital scale. Both functions set the measurement range 'zero' point which compensates for any intrinsic offset within the sensor.

1. If tank contains product (liquid), then turn the equalization valve located near the Cyl-Tel/Tank-Tel gauge to the EQUALIZATION/SERVICE position. If the tank is empty, skip to step 2.
2. Press the 'ON' button to turn on the gauge display.
3. Hold the 'ON' button for 15 seconds to access the MAIN MENU.
4. In the MAIN MENU select 'MORE', at the bottom of the screen and press the 'NEXT' button.
5. On the MORE FEATURES menu select 'DP Zero' and press 'NEXT.'

6. The screen will display *"PLEASE WAIT"* for a few seconds at the bottom of the screen and then the new DP Zero value will appear below the old.
7. Apply the new DP Zero by pressing the 'NEXT' button.
8. To save the settings scroll down to 'SAVE' and press the 'NEXT' button.
9. Press the 'EXIT' button to return to the main screen.

Setting Correct Saturation Pressure

Note: *Setting the correct liquid saturation pressure is also critical for accurate liquid level measurement. The set pressure is used to determine the liquid density, which in turn is used in the liquid level and volume calculations. An incorrect pressure setting can cause the level reading to be significantly higher or lower than the actual level within the tank.*

1. Press the 'ON' button to turn on the gauge display.
2. Hold the 'ON' button to access the MAIN MENU.
3. Select 'SET CUSTOM' and press the 'NEXT' button.
4. Scroll down and select the 'PRESSURE' option and press the 'NEXT' button.
5. Using the up and down buttons, set the pressure to an average between Orca/delivery truck pressure and PB set point of the tank. Press the 'NEXT' button to apply the setting.
6. Scroll down and select 'SAVE.' Press the 'NEXT' button to save the setting.
7. Confirm the contents of the tank by pressing the 'NEXT' button. If the contents are incorrect use the up and down buttons to cycle through before pressing the 'NEXT' button.
8. On the 'SETUP DISPLAY' screen select the 'SAVE' option and press 'NEXT.'
9. Press the 'EXIT' button to return to the main screen.
10. Verify liquid level/volume reading with actual tank liquid level.

Standard Tank Configuration (If Gauge Previously Setup)

1. Press the 'ON' button to turn on the gauge display.
2. Hold the 'ON' button for 15 seconds to access the MAIN MENU.
3. Select 'SET TANK' and press the 'NEXT' button. This allows access to the standard tank list built into the gauge.
4. Use the up and down buttons to cycle through the different tanks. Select the desired tank and press the 'NEXT' button to apply the setting.
5. On the 'SET CONTENTS' screen use the up and down buttons to set the correct liquid contents of the tank. With the desired contents selected press the 'NEXT' button to apply the setting.
6. On the 'SETUP DISPLAY' screen select the default units you wish to have displayed when the 'ON' button is pressed.
7. To save the settings select the 'SAVE' option and press the 'NEXT' button to save the settings.
8. Check the DP Zero and Pressure settings to make sure they are correct.

Setting Alarms

Note: *Alarms are only active with external power. They are inactive on battery power.*

1. Press the 'ON' button to turn on the gauge display.
2. Hold the 'ON' button for 15 seconds to access the MAIN MENU.
3. In the MAIN MENU use the up and down buttons to select the 'ALARMS' option and press the 'NEXT' button.
4. The gauge is capable of setting up three separate alarms. Choose one with the up and down buttons and press the 'NEXT' button to start configuring it.
5. Under the alarm text a '*' will be highlighted with the alarm number next to it. Press the right button to select the number next to the '*'.
6. Use the up and down buttons to set the alarm to go off when the tank is greater than (>=) or lesser than (<=) a desired value.

7. Press the right button to select the number next to the '0/0'. Use the up and down buttons to set the value at which the alarm will go off.

8. After the alarm parameters have been set select the 'SAVE' option and press the 'NEXT' button to save and apply the settings.

Note: *From the main screen press the 'ALARM' button to toggle the display of the active alarms.*

Troubleshooting

Refer to the table below for troubleshooting procedures. The table is arranged in a Symptom/Possible Cause/Solution format. Note that possible causes for specific symptoms are listed in descending order of significance. That is, check out the first cause listed before proceeding to the next. If you need further assistance please call the Customer Support Hotline at 1-800-400-4683.

Symptom	Possible Cause	Solution
Cyl-Tel/Tank-Tel gauge does not turn on.	Battery dead, low, installed incorrectly or missing.	Replace battery.
	Transformer not plugged in or faulty wiring.	Inspect wiring and insure transformer is plugged in. Reset circuit breaker.
	Electrical supply circuit breaker tripped.	Reset breaker.
	Faulty Cyl-Tel/Tank-Tel.	Replace Cyl-Tel/Tank-Tel front.
	Physical keypad not connected to Cyl-Tel/Tank-Tel circuit board.	Verify that the ribbon cable for the keypad is connected to the Cyl-Tel/ Tank-Tel circuit board.
Cyl-Tel/Tank-Tel display always reads 0%.	No product in tank.	Ensure there is liquid in tank.
	Equalization valve in the equalization position.	Turn valve to the "Normal Operation" position.
	Equalization valve installed incorrectly.	See user manual to confirm proper installation.
	Phase lines installed incorrectly.	See user manual to confirm proper installation.
	Tank parameters are improperly set.	Verify each parameter in the Cyl-Tel/ Tank-Tel focusing on the tank selection and DP zero setting.
	Faulty Cyl-Tel/Tank-Tel gauge.	Replace Cyl-Tel/Tank-Tel front.
Display always reads 100%.	Tank parameters are improperly set.	Verify each parameter focusing on the tank selection and DP zero setting.
Display reads "OUT OF RANGE".	The gauge thinks the tank is over 100% full.	Verify each parameter focusing on the tank selection and DP zero setting.
Liquid level display does not drop to 0% when in equalization mode.	Cyl-Tel/Tank-Tel DP zero setting is incorrect.	Follow the DP zero section to reset the DP zero setting.

Symptom	*Possible Cause*	*Solution*
Liquid level display is not accurate.	DP zero setting is incorrect.	Follow the DP zero section to reset the DP zero setting.
	Incorrect differential pressure sensor selected.	Refer to user manual to ensure correct sensor selected.
	Incorrect pressure setting.	Follow pressure section to reset the pressure setting.
	Incorrect tank dimensions.	Follow tank selection section to select tank.
	Incorrect tank orientation.	Follow tank selection section to select tank.
Display reads “OPEN LOOP”.	DP sensor not connected to Cyl-Tel/ Tank-Tel circuit board.	Verify that the sensor is connected to the back of the board (J21).
	Incorrect differential pressure sensor selected.	Refer to user manual to ensure correct differential pressure sensor is selected.
(Optional) pressure display always reads 0.	Pressure sensor not connected to the Cyl-Tel/Tank-Tel circuit board.	Verify that the pressure sensor is connected to terminal J18 on the back of the Cyl-Tel/Tank-Tel circuit board.

Standard MicroBulk Tank List

Note: *This table includes recommended pressure settings for the Cyl-Tel Liquid Level Gauge*

Display Order	PN	Tank Model	Length (in)	Diameter (in)	Orientation	RV PSI	PB PSI	Pressure Setting PSI
1		PERMA-CYL 230 MP	37.1	24.0	VERTICAL	250	125	100
2	10982263	PERMA-CYL 230 VHP	37.1	24.0	VERTICAL	350	300	200
3	11529508	PERMA-CYL 300 MP	49.1	24.0	VERTICAL	250	120	100
4	10914877	PERMA-CYL 450 MP	50.9	27.6	VERTICAL	250	120	100
5	10899005	PERMA-CYL 450 HP	50.4	27.6	VERTICAL	350	300	200
6	10907634	PERMA-CYL 450 VHP	51.8	27.2	VERTICAL	500	450	250
7	11684305	PERMA-CYL 700 HP	47.5	37.3	VERTICAL	350	300	200
8		PERMA-CYL 700 VHP	47.5	37.3	VERTICAL			200
9	10879864	PERMA-CYL 1000 MP	65.2	37.4	VERTICAL	250	120	100
10	10923909	PERMA-CYL 1000 HP	65.0	37.3	VERTICAL	350	300	200
11	11075024	PERMA-CYL 1000 VHP	64.8	37.1	VERTICAL	500	450	250
12	11501804	PERMA-CYL 1500 HP	69.0	44.0	VERTICAL	350	300	200
13	11202441	PERMA-CYL 1500 VHP	69.0	44.0	VERTICAL	500	450	250
14		PERMA-CYL 2000 HP	94.2	44.0	VERTICAL	350	300	200
15	11844313	PERMA-CYL 2000 VHP	94.2	44.0	VERTICAL	500	450	250
16	14401278	PERMA-CYL 3000 HP	98.0	50.4	VERTICAL	350	300	200
17	14507523	PERMA-CYL 3000 VHP	98.0	50.4	VERTICAL	500	450	250
18		PT-1000	96.1	59.6	HORIZONTAL			0
19		XT-2500	219.8	60.0	HORIZONTAL			0
20		DURA-CYL 265 MP	42.2	24.0	VERTICAL	230	100	100
21		DURA-CYL 265 HP	42.2	24.0	VERTICAL	350	100	100
22	10672951	MEGA-CYL 450 MP	50.4	27.6	VERTICAL	250	120	100
23	10588979	MEGA-CYL 450 HP	50.4	27.6	VERTICAL	350	300	200
24	10473573	MEGA-CYL 600 MP	51.5	33.5	VERTICAL	250	120	100
25	10513758	MEGA-CYL 600 HP	51.3	33.3	VERTICAL	350	300	200
26	10485283	MEGA-CYL 800 MP	55.5	37.4	VERTICAL	250	120	100
27	10670262	MEGA-CYL 800 HP	55.9	37.2	VERTICAL	350	300	200
28	10858975	MEGA-CYL 1000 MP	65.2	37.4	VERTICAL	250	120	100
29	10752281	MEGA-CYL 1000 HP	65.2	37.4	VERTICAL	350	300	200
30	10619659	LASER-CYL 450 VHP	50.4	27.4	VERTICAL	500	450	250
31		CARBO-MAX 750	49.3	24.0	VERTICAL			300

Cyl-Tel/Tank-Tel Sensor Names

The following tables explain the sensor names used in the Cyl-Tel/Tank-Tel liquid level gauge firmware on rev. 2.6M and later. If the Cyl-Tel/Tank-Tel gauge has rev. 2.6M or later then the sensor name will be printed on the back label of the gauge for the customer's reference. The names are used when selecting the sensor type in the Cyl-Tel/Tank-Tel gauge menu. For example, if a Cyl-Tel gauge has a brass block sensor on the back, the sensor needs to be DP4 in the sensor type in the setup menu.

The tables below give a complete list of sensors currently compatible with the Cyl-Tel/Tank-Tel liquid level gauges.

Differential Pressure Sensors

Cyl-Tel/Tank-Tel Sensor Name	Sensor Type	Sensor Range
DP1	AST15	415 "H_2O
DP2	AST7.25	200 "H_2O
DP3	AST30	830 "H_2O
DP4	Brass Block 200	200 "H_2O
DP5	Brass Block 1000	1000 "H_2O
DP6	Brass Block 2000	2000 "H_2O
DP7	Data Online 200(1)	200 "H_2O
DP8	Data Online 600(1)	600 "H_2O

(1) Data Online Sensors require a special adaptor cable

Gauge Pressure Sensors

Cyl-Tel/Tank-Tel Sensor Name	Sensor Type	Sensor Range
OFF	None Attached	--
GP1	AST 50 Bar	725 psig
GP2	MLH Honeywell	1000 psig
GP3	WIKA	600 psig